

2: ASSET CLASSES AND FINANCIAL INSTRUMENTS

MONEY MARKET SECURITIES

Characteristics

- . Short-term IOUs**
- . Highly Liquid (Like Cash)**
- . Nearly free of default-risk**
- . Denomination**
- . Issuers**

Types

- Treasury Bills**
- Negotiable CDs**
- Commercial Paper**

Characteristics of Bonds (cont.)

- **Coupon**
- **Par (Face) Value**
- **Default risk**

Types of Bonds

Federal Govt. (Treasury) Securities

Federal Agency Securities

. Ex. HUD

Federally-Sponsored Agency Securities

. Ex. FNMA (Fannie Mae), GNMA (Ginnie Mae), FHLMC (Freddie Mac), SLMA (Sallie Mae)

Types of Bonds (cont.)

Municipal Securities (Munis)

Corporate Bonds

- **Call feature**
- **Security**
- **Convertibles**

EQUITY (COMMON STOCK)

Ownership Claim: Voting Rights

Residual Claim: No Promises, But Has Upside

∞ Life

Listing And Trading

No Promises: No Default

Dividends

. Decided by the Board of Directors

. Tax: 70% Exclusion For Corporate Investors

PREFERRED STOCK

Hybrid Of Debt And Equity

Equity-Like Features

- ∞ Life, But Mostly Callable

- No Promises: No Default

Debt-Like Features

- Max Dividend Specified

Convertibles

Cumulation

DERIVATIVE SECURITIES: OPTIONS

Side Bet Among Investors

One-Sided Bet: Right (But Not Obligation)

On Equity, Currencies, Equity Index

Types of Options:

- **Call: Right To Buy**

- **Put: Right To Sell**

Option Markets: CBOE, AMEX

DERIVATIVE SECURITIES: FUTURES

Agreement, Not Option, To Buy Or Sell

On Commodities, Financials

Market: CBT

STOCK INDICES

Uses

- **Track Average Returns**
- **Comparing Performance Of Money Managers**

Factors In Constructing Or Using An Index

- **Broad Or Narrow?**
- **Construction**
 - **Price Weighted**
 - **Value Weighted**
 - **Equal Weighted**
- **Domestic Indices**
 - **Dow Jones Industrial Average (DJIA)**
 - **Standard And Poor's (S&P) 500 Composite**
 - **Nasdaq Composite**
 - **Wilshire 5000**

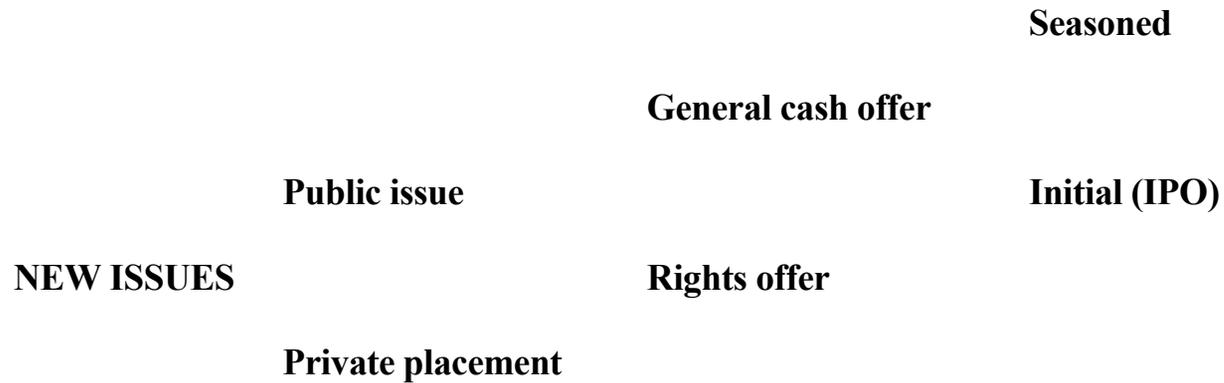
International Indices

- **Nikkei 225**
- **FTSE**
- **DAX**
- **Regional (Ex. Far East, EAFE)**

3: SECURITY MARKETS

PRIMARY (NEW ISSUE) MARKET

Types of new issues



Organization Structure

Disclosure requirements

- **Registration statement with SEC**
- **Prospectus**
 - Preliminary**
 - Final**

Issue costs

- **Administration**
- **Underwriting**
- **Underpricing**

Shelf Registration

Private Placement

SECONDARY MARKETS

Organized exchanges

National (NYSE, AMEX) and Regional (PHLX, CIN, MW, Pacific, etc.)

Function

Organization

Organized exchanges (cont.)

Types of members (NYSE)

Brokers

Specialists

Listing requirements

OTC Market

NASDAQ

Pink Sheet

Third Market

Fourth Market

Relative importance of various markets

SECURITIES TRADING

How orders work

Organized Exchanges

OTC Market

Commissions

Securities Amendment Act, 1975

Trading Arrangements

Types of Orders

Buy / Sell / Short Sell

Open (GTC) / Day

Types

Market Order

Limit

Stop Loss

Margin Trading

Ex. Buy at 60% margin

Initial Margin Requirement (Fed)

Maintenance Margin Requirement (Exchange)

Margin Call

Ex. You bought 1000 shares of Xerox at \$80 at 50% initial margin.

a. If the stock price drops to \$60, what is the % margin in the account? What is your rate of return?

b. What if the stock goes to \$90?

c. If the maintenance margin is 25%, below what stock price will there be a margin call?

Short Sales

Ex. Suppose you sell short 1,000 shares of AT&T at \$80.

a. Six months later the stock has dropped to \$50. What is your profit?

b. Suppose the stock begins to fall soon after your original short sale. At what price should you cover your position to make a gross profit of \$20,000?

4: MUTUAL FUNDS AND OTHER INVESTMENT COMPANIES

Mutual (Open-End) Vs. Closed-End Funds

Types of Funds

- **Money Market Funds**

- **Stock Funds**
 - **Growth Funds**
 - **Income Funds**
 - **Sector Funds: Tech, Biotech, Electronics, Telecom, Precious metals,...**
 - **International Funds: Country, Region**

- **Bond Funds**
 - **Treasury Bond Funds: Short-, medium-, or long-term**
 - **Corporate Bond Funds: AAA, BBB, High-yield,...**
 - **Municipal Bond Funds: State, City,...**

- **Life-cycle (Target date) Funds**

Open-End (Mutual Funds)

- **Buying And Selling**

- **Price: Net Asset Value (NAV)**

- **Holding Period Return (HPR)**

Closed-End Funds

- **Buying And Selling**

- **Smaller Market**

- **Market Price Vs. NAV**

Actively Managed Vs. Passive (Index) Funds

Exchange Traded Funds (ETFs)

Regulation

- . Investment Cos. Act, 1940**

- . Investment Advisors Act, 1940**

- . Securities Act, 1933**

- . Securities Exchange Act, 1934**

- . State Laws**

“Regulated” Investment Company

- . Distributions to shareholders tax-free**

- . Requirements**

 - . $\geq 90\%$ of earnings from security transactions**

 - . Distribute $\geq 90\%$ of income**

 - . $\leq 5\%$ of assets in securities of one issuer (for $\geq 50\%$ of assets)**

 - . $\leq 25\%$ ownership of any security**

COSTS AND BENEFITS OF INVESTING IN MUTUAL FUNDS

COSTS

- . Load**
- . Management Fee**
- . 12 B-1 Fee**
- . Transaction Costs**
- . Other Expenses**

BENEFITS

- . Diversification**
- . Professional Management**
- . Lower Trading Costs**
- . Other Services (Safekeeping, Check-writing, Account maintenance)**

OTHER INVESTMENT COMPANIES

Venture Capital (VC) Firms

Private Equity Firms

Hedge Funds

5 & 6: RISK, RETURN AND PORTFOLIO DIVERSIFICATION

Why do we need to compute rates of return?

- . To measure past performance**
- . To make investment decisions**
- . To estimate cost of capital**

. Holding Period Return

$$R_t = \text{HPR}_t = (p_t - p_{t-1} + d_t)/p_{t-1}$$

Ex. Suppose we bought Microsoft at \$100 a year ago and received a \$2 dividend during the year. If the stock price today is \$150, what is our simple rate of return over the period?

Multi-period Return

Arithmetic Mean

$$r_{am} = (r_1 + r_2 + \dots + r_n) / n$$

Geometric Mean

$$r_{gm} = [(1+r_1) \cdot (1+r_2) \cdot \dots \cdot (1+r_n)]^{1/n} - 1$$

Ex. You are thinking of investing in a mutual fund that had returns of 20%, -10% and 40% over each of the last three years. Compute the arithmetic and the geometric mean annual rates of return. Which is the relevant return?

Inflation and real rate of return

$$r_r = (1 + r_n) / (1+i) - 1$$

Ex. Suppose you are a Brazilian investor thinking of investing in long-term government bonds yielding 150%. If the inflation rate is 130%, what is the real rate of return on these bonds?

Risk preferences of investors

Ex. You face a choice between investing in two securities, both priced at \$100. One has a certain payoff of \$110 next year. The other will pay either \$90 or \$130 with equal chance next year. Which security would you choose?

Risk-averse investors

Risk-neutral investors

Risk-loving investors

Required Rate of Return = Riskfree rate + Risk premium

Ex. If T-Bills are yielding 5% and the stock market has a historical risk premium of 8.6%, what rate of return do investors require on stocks over the next year?

Risk premium

$$E_p - r_f = .5 A \sigma_p^2$$

$$\therefore A = (E_p - r_f) / .5 \sigma_p^2$$

A = Coefficient of risk-aversion

Ex. If the expected return on a portfolio is 11%, its standard deviation is 20%, and the risk-free rate is 5%, what is the risk-aversion coefficient of the investor?

Expected Return on a stock

$$E = E(r) = \sum_{s=1}^S p_s r_s$$

Variance of a stock

$$\sigma^2 = \text{Var}(r) = \sum_{s=1}^S p_s [r_s - E(r)]^2$$

Ex. You think that over the next year, there is a 50% chance that Motorola will have return of 14%. There is a 30% chance of a 35% return, and a 20% chance of losing 8% of your investment. Compute the expected return and variance for Motorola.

Mean-Variance Criterion (Dominance Principle)

Investors like higher E and lower σ .

More precisely, they prefer stock (or asset) 1 to stock 2, if either of the following two conditions hold.

1. $E_1 > E_2$ and $\sigma_1 \leq \sigma_2$, or

2. $\sigma_1 < \sigma_2$ and $E_1 \geq E_2$

Then asset 1 *dominates* asset 2 (written as: $1 \succ 2$). Asset 1 is the *dominant* asset.

Ex. Find the dominant assets from among the following pairs of assets.

	Asset	E (%)	σ (%)
a.	1	18	20
	2	14	20
b.	3	15	18
	4	13	8
c.	5	14	14
	6	14	10

PORTFOLIO EXPECTED RETURN AND VARIANCE

Covariance between stocks i and j

$$\sigma_{ij} = \text{Cov}(r_i, r_j) = \sum_{s=1}^S p_s (r_{is} - E_i) (r_{js} - E_j)$$

Correlation between stocks i and j

$$\rho_{ij} = \text{Corr}(r_i, r_j) = \sigma_{ij} / (\sigma_i \sigma_j)$$

Ex. Compute the covariance and correlation among stocks A and B from the following joint probability distribution of their rates of returns.

p	r_A (%)	r_B (%)
.5	18	14
.3	-15	35
.2	10	-8

Portfolio

Portfolio p has n stocks with weights x_1, x_2, \dots, x_n .

Expected return of portfolio p

$$E_p = E(r_p) = \sum_{i=1}^n x_i E_i = x_1 E_1 + x_2 E_2 + \dots + x_n E_n$$

Variance of portfolio p

$$\sigma_p^2 = \text{Var}(r_p) = \sum_{i=1}^n \sum_{j=1}^n x_i x_j \sigma_{ij}$$

Variance of a 2-stock portfolio

$$\sigma_p^2 = x_1^2 \sigma_1^2 + x_2^2 \sigma_2^2 + 2 x_1 x_2 \sigma_{12}, \text{ where}$$

$$\sigma_{12} = \rho_{12} \sigma_1 \sigma_2$$

Variance of a 3-stock portfolio

$$\sigma_p^2 = x_1^2 \sigma_1^2 + x_2^2 \sigma_2^2 + x_3^2 \sigma_3^2 + 2 x_1 x_2 \sigma_{12} + 2 x_1 x_3 \sigma_{13} + 2 x_2 x_3 \sigma_{23}$$

Ex. You have the following information about 3 stocks:

Stock	E(r)	σ	Correlations		
1	.15	.22		2	3
2	.12	.25	1	.6	.4
3	.15	.3	2		.5

Compute the expected return and standard deviation of returns of a portfolio with:

- 1. Equal investment in stocks 1 and 2**
- 2. 30% in stock 1 and the rest in stock 2.**
- 3. 150% in stock 1 and the rest in stock 3.**
- 4. Equal investment in the three stocks.**

Ex. From the joint probability distribution of returns on stocks A and B, compute the probability distribution of returns on the following portfolios. Then compute the expected return and standard deviation of returns on these portfolios.

1. Equal investment in stocks A and B

2. 30% in stock A and the rest in stock B

p	r_A (%)	r_B (%)
.5	18	14
.3	-15	35
.2	10	-8

Ex. Now compute the expected return (E) and standard deviation of returns (σ) on these two portfolios from the E and σ of stocks A and B that you computed on page 1. Verify your answers from the ones above.

Stock	E (%)	σ (%)
A	6.5	14.4
B	15.9	15.02

$$\rho_{AB} = -0.7$$

PORTFOLIO THEORY

The Effect Of Diversification On Portfolio Risk

· 2-stock case

$$\sigma_p^2 = x_1^2 \sigma_1^2 + x_2^2 \sigma_2^2 + 2 x_1 x_2 \rho_{12} \sigma_1 \sigma_2$$

If $\rho_{12} = +1$, $\sigma_p =$

If $\rho_{12} = -1$, $\sigma_p =$

Here, $\sigma_p = 0$, if

If $\rho_{12} = 0$, $\sigma_p =$

In general, if $\rho_{12} < 1$, $\sigma_p <$

Ex. Following are the expected return (E) and standard deviation (σ) of two stocks.

Stock	E (%)	σ (%)
1	10	30
2	20	40

Compute E and σ of a portfolio that is invested 60% in stock 1 and the rest in stock 2, if the two stocks have a correlation of:

(a) +1

(b) -1

(c) 0

(d) For case (b), find the weights of the two stocks in the zero-variance portfolio, and the expected return of this portfolio.

· n-stock case (EW portfolio)

$$\sigma_p^2 = \text{Var}(r_p) = \sum_{i=1}^n \sum_{j=1}^n x_i x_j \sigma_{ij}$$

Here, $x_i = 1/n$ for all i

$$\therefore \sigma_p^2 = (\sum \sum \sigma_{ij}) / n^2$$

Let \overline{Var} = average variance of the n stocks, and

\overline{Cov} = average covariance between all pairs among the n stocks

Then, $\sigma_p^2 = (1/n) \overline{Var} + (1 - 1/n) \overline{Cov}$

$$\therefore \lim \sigma_p^2 = \overline{Cov}$$

Ex. Suppose the annual standard deviation of a typical stock is 25% and the correlation among typical pairs of stocks is 0.3. Find the variance of an equal weighted (EW) portfolio of (a) 10 stocks, (b) 20 stocks, (c) 100 stocks, and (d) a fully diversified portfolio.

Portfolio measure of risk of asset i (in portfolio p):

$$\sigma_{ip} / \sigma_p^2$$

Set of Efficient (Non-dominated) Assets

Ex. Find the set of efficient assets from among the following stocks:

Stock	A	B	C	D	E	F	G	H
E (%)	10	12.5	15	16	17	18	18	20
σ (%)	23	21	25	29	29	32	35	45

Efficient set of risky assets and portfolios

Efficient set of risky and riskfree portfolios

7: CAPITAL MARKET THEORY

Capital Market Line (CML)

$$E_i = r_f + (\sigma_i/\sigma_m) (E_m - r_f)$$

Ex. Suppose $r_f = 5\%$, $E_m = 13\%$, and $\sigma_m = 20\%$. You are considering three fully diversified funds. Which of them are overvalued (bad buys) and which are undervalued (good buys)?

Fund	E (%)	σ (%)
A	10	15
B	15	22
C	20	25

Security Market Line (SML)

Capital Asset Pricing Model (CAPM)

$$E_i = r_f + \beta_i (E_m - r_f)$$

Ex. If the risk-free rate is 5% and the market's expected return is 10%, which of the following stocks are good investments and which are bad investments?

Stock	E (%)	β
A	10	0.5
B	9	1
C	12	1.2

Portfolio Selection with CAPM

Relation between β_i and ρ_{im}

Ex. Suppose security markets are in equilibrium and CAPM holds. We know that $E_m = 10\%$ and $r_f = 5\%$. We have the following information about two stocks and the market portfolio. What return do investors expect on stocks A and B?

Stock	σ (%)	ρ_{im}
A	20	.4
B	30	.6
m	25	

Relation between CML and SML (CAPM)

SINGLE INDEX MARKET MODEL (SIMM)

$$r_{it} = \alpha_i + \beta_{it} r_{mt} + e_{it}, \text{ where}$$

$$E(e_{it}) = 0 \text{ for all } t,$$

$$\text{Var}(e_{it}) = \sigma_{ei}^2 \text{ for all } t,$$

$$\text{Cov}(e_{it}, e_{jt}) = 0 \text{ for all } t, \text{ for all } i \neq j$$

$$\text{Cov}(e_{it}, r_{mt}) = 0 \text{ for all } t$$

Relation between SIMM and CAPM

RELATION between β_i and σ_i

$$\sigma_i^2 = \beta_i^2 \sigma_m^2 + \sigma_e^2$$

Ex. Following are the estimates from the single index market model for stocks A and B. Find the average returns and standard deviations on stocks A and B given that the average return on the market index (m) was 10% and its standard deviation was 20%.

Stock	α	β	σ_e^2
A	-1.3	0.8	100
B	2.4	1.2	50

RELATION between σ_{ij} , β_i and β_j

$$\sigma_{ij} = \beta_i \beta_j \sigma_m^2$$

Ex. Find ρ_{AB} given $\sigma_m = 20\%$ and

Stock	β	σ
A	0.8	35
B	1.2	25

Portfolio β

β of a portfolio p consisting of n assets where

x_i = Weight of asset i, $i = 1, 2, \dots, n$

β_i = β_i of asset i

is given by:

$$\beta_p = \sum_{i=1}^n x_i \beta_i = x_1 \beta_1 + x_2 \beta_2 + \dots + x_n \beta_n$$

Ex. Funds A, B, and C have betas of 0.8, 1.5 and 1.8, respectively.

- a. Find the beta of a portfolio that is invested 40% in Fund A, 25% in Fund B, and 35% in Fund C.
- b. If the riskfree rate is 4% and the risk premium on the market portfolio is 6%, what is the expected return and risk premium on the portfolio in part a?

Expected return and standard deviation of a portfolio of a riskfree and a risky asset

Portfolio *i* is invested in a riskfree asset and a risky portfolio *p*. The weight and return on the riskfree asset are x_f and r_f . The expected return (E) and standard deviation (σ) of portfolio *p* are E_p and σ_p . Then the E and σ of portfolio *i* are:

$$E_i = x_f r_f + (1 - x_f) E_p$$

$$\sigma_i = (1 - x_f) \sigma_p$$

Ex. The expected return and standard deviation of Blue Skies Fund are 16% and 25%. If the riskfree rate is 4%, find the expected return and standard deviation of a portfolio *i* invested 30% in the riskfree asset and the remaining in the fund.

1. Suppose you manage a risky portfolio with an expected rate of return of 17% and a standard deviation of 27%. The T-bill rate is 7%.

a. Your client chooses to invest 70% of a portfolio in your fund and 30% in a T-bill money market fund. What is the expected return and standard deviation of your client's portfolio?

b. If your risky portfolio includes the following investments in the given proportions, what are the investment proportions of your client's overall portfolio, including the position in T-bills?

Stock A	27%
Stock B	33%
Stock C	40%

c. What is the reward-to-volatility ratio (S) of your risky portfolio and your client's overall portfolio?

d. Draw the CAL of your portfolio on an expected return/standard deviation diagram. What is the slope of the CAL? Show the position of your client on your fund's CAL.

2. Suppose you manage a risky portfolio with an expected rate of return of 17% and a standard deviation of 27%. The T-bill rate is 7%. You estimate that a passive portfolio invested to mimic the S&P 500 stock index yields an expected rate of return of 13% with a standard deviation of 25%. Draw the CML and your fund's CAL on an expected return/Standard deviation diagram.

a. What is the slope of the CML?

b. What is the advantage of your fund over the passive fund?

3. Suppose that many stocks are traded in the market and that it is possible to borrow at the risk-free rate, r_f . The characteristics of two of the stocks are as follows:

Stock	Expected Return	Standard Deviation
A	8%	40%
B	13	60
Correlation = -1		

Could the equilibrium r_f be greater than 10%? (Hint: Can a particular stock portfolio be substituted for the risk-free asset?)

4. Investors expect the market rate of return this year to be 10%. The expected rate of return on a stock with a beta of 1.2 is currently 12%. If the market return this year turns out to be 8%, how would you revise your expectation of the rate of return on the stock?

5. Karen Kay, a portfolio manager at Collins Asset Management, is using the capital asset pricing model for making recommendations to her clients. Her research department has developed the information shown in the following exhibit.

Forecasted Returns, Standard Deviations, and Betas			
	Forecasted Return	Standard Deviation	Beta
Stock X	14.0%	36%	0.8
Stock Y	17.0	25	1.5
Market index	14.0	15	1.0
Risk-free rate	5.0		

- a. Calculate expected return and alpha for each stock.**
- b. Identify and justify which stock would be more appropriate for an investor who wants to**
 - i. Add this stock to a well-diversified equity portfolio.**
 - ii. Hold this stock as a single-stock portfolio.**

6. What must be the beta of a portfolio with $E(r_P) = 20\%$, if $r_f = 5\%$ and $E(r_M) = 15\%$?

7. The market price of a security is \$40. Its expected rate of return is 13%. The risk-free rate is 7%, and the market risk premium is 8%. What will the market price of the security be if its beta doubles (and all other variables remain unchanged)? Assume the stock is expected to pay a constant dividend in perpetuity.

8. Based on current dividend yields and expected capital gains, the expected rates of return on portfolios A and B are 11% and 14%, respectively. The beta of A is 0.8 while that of B is 1.5. The T-bill rate is currently 6%, while the expected rate of return of the S&P 500 Index is 12%. The standard deviation of portfolio A is 10% annually, while that of B is 31%, and that of the index is 20%.

a. If you currently hold a market index portfolio, would you choose to add either of these portfolios to your holdings? Explain.

b. If instead you could invest *only* in bills and one of these portfolios, which would you choose?

8: SECURITY MARKET EFFICIENCY

Technical Analysis

Fundamental Analysis

The Efficient Markets Hypothesis (EMH)

Forms of Market Efficiency

- **Weak Form**

- **Semistrong Form**

- **Strong Form**

EVIDENCE ON EMH

Tests of the Weak Form EMH

- **Filter Rules**
- **Serial Correlation Tests**
- **Weekend Effect**
- **Yearend (January) Effect**

EVIDENCE ON EMH (cont.)

Tests of the Strong Form EMH

- **Specialist's Order Book**

- **Insider Trading**

- **Professional Investors (Mutual Funds)**

- **Risk Arbitrageurs (Arbs)**

10 & 11: BOND VALUATION

Present Value (PV) of A Bond

Yield to Maturity (ytm)

. Ytm Of A Zero-Coupon Bond

Spot And Forward Interest Rates

Ex. Given the following prices of zero-coupon bonds, find the sequence of spot and forward rates.

n (years)	p_0
1	\$952.38
2	\$898.45
3	\$827.85

Ex. In the problem above, what is the price and ytm of a 3-year 10% annual coupon bond?

Level Of Interest Rates

Term Structure Of Interest Rates (Yield Curve)

- **Measuring The Term Structure**

- **Explaining The Shape Of The Yield Curve**

- **Expectations Hypothesis**

- **Liquidity Premium Hypothesis**

- **Segmentation Hypothesis**

- **A Synthesis of the three explanations**

Risk Structure Of Interest Rates

- . Two types of risk in bonds**

- Default Risk**

- . Bond Rating**

 - = F(Issuer's Financial Condition, Terms Of Bond Issue)**

- . Spreads Over Treasuries**

- . Junk Bonds**

Impact Of Embedded Options

- **Call Provision**

- **Conversion Feature**

Other Measures Of Bond Yields

- **Coupon Rate**

- **Current Yield (CY)**

Ex. What is the CY for a 13% bond selling for \$1,250?

Other Measures of Bond Yields (cont.)

. Yield To Call (YTC)

Ex. What is the YTC of a 20-year 7% semi-annual coupon bond selling for \$1,200 that is callable after 5 years at \$1,050?

· Holding Period Return (Realized Yield)

Ex. What is the HPR on a 13% 7-year bond selling at \$1,200 that you bought a year ago at \$1,250?

Bond Pricing Principles

Bond prices

. If $y_{tm} = i$, $p_0 = F$

. Change with passage of time

Ex. You bought a 13% 7-year annual coupon bond a year ago for \$1,250. What is its price today if interest rates are unchanged?

Bond Pricing Principles (cont.)

- . Are inversely related to ytm**

- . Are more sensitive to ytm changes for longer maturity**

- . Have a linear positive relation to coupon rate**

Duration (D)

Weighted average maturity of the bond

i.e., Weighted average time until CFs, weighted by PVs of CFs

Ex. Find the duration of a 7% 3-year annual coupon bond selling at \$1,026.73.

A simpler formula for duration

Interest Rate Risk

Properties of Duration

Duration

- . Usually Declines over time**

- . Is usually negatively related to ytm**

Properties of Duration (cont.)

- . Is usually positively related to maturity**
- . Is negatively related to coupon**
- . Of a bond portfolio is the weighted average duration of the bonds in the portfolio.**

Ex. You have \$10,000 invested in a 20-year 10% semi-annual coupon bond that is yielding 8% and \$5,000 invested in a 5-year zero-coupon bond. What is the duration of your bond portfolio?

- . If $i=0$, $D=T$.**

Immunization

- Cash-flow matching**
- Duration matching**

Ex. You anticipate a tuition liability of \$40,000 per year at the end of 3 and 4 years from now. What are two ways of providing for it that are immune to interest rate risk? The current market interest rate is 8%.

13: EQUITY VALUATION

Uses of Stock Valuation Models

- . Investment decisions (Stock picking)**
- . IPO Valuation**
- . Estimating discount rates**

The Basic Valuation Model

Dividend Discount Model

Does the holding period matter?

Constant Dividend Model

Constant Growth Model

Ex. A stock just paid a dividend of \$1. Dividends are expected to grow at 6% per year indefinitely. The riskfree rate is 5% and the stock has a β of 1.2. The expected market risk premium is 5%.

a. What should the stock sell at?

b. If investors revise their expectations of future growth rate of dividends and earnings to 3%, what will be the new stock price? What is the % decline in stock price?

Variable Growth Model

- **2-Stage Growth**

- **Multistage Growth**

Ex. A stock just paid a dividend of \$1. The dividend is expected to grow at 25% per year over the next 3 years and at 5% per year indefinitely after that. What should be the stock price if the required return is 20%?

Ex. A stock is expected to pay a dividend of \$1.25 per year over the next 5 years. After that, dividends are expected to grow at an annual rate of 7%. At what price should the stock sell if investors require a return of 18% on the stock?

Ex. A stock is expected to pay a dividend of 60 cents the next year, \$1.10 the following year, and \$1.25 per year after that. What is its price? The riskfree rate is 9%, the stock has a beta of 1.5 and the expected market risk premium is 6%.

Finding Cost of Equity with Constant Growth Model

P/E Ratio

15: STOCK OPTIONS: CONCEPTS & STRATEGIES

Definition: *Right to buy or sell a stock at a fixed **exercise price** on or before a fixed **maturity date**.*

Call

Types

Put

Terminology **Call price (c)**

Exercise price (X)

Maturity date (T)

Ex. July \$110 call on IBM at \$6 when the stock price is \$108.

European

Types

American

In the money

Option At the money

Out of the money

Intrinsic value

Option premium

Time value

TRADING STRATEGIES

Buy a call

Sell a call

Buy a put

Sell a put

Buy a stock and a put (Buy a protective put)

Write (Sell) a covered call

Bullish spread

Bearish spread

Straddle

16: OPTION VALUATION

Why won't the DCF method work?

Valuation by replication

Hedge ratio or Option δ (delta)

Determinants of call option value

Black-Scholes Model

Put-call parity

18: PORTFOLIO PERFORMANCE EVALUATION

PERFORMANCE MEASURES

- **Sharpe Measure**

- **Treynor Measure**

- **Jensen Measure**

Modigliani and Modigliani (M^2) Measure

Ex. You have the following information about three funds and the market. Compute the Sharpe, Treynor, Jensen and M^2 measures. Which funds had good performance? Which outperformed the market?

Fund	\bar{r}	σ_r	β
A	.13	.18	0.8
B	.17	.22	1.2
C	.16	.23	1.05
Market	.14	.2	
Riskfree	.08		